UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/696,280	10/29/2003	Hiroyasu Nishiyama	81940.0060	6493

26021 7590 12/19/2006

HOGAN & HARTSON L.L.P.
1999 AVENUE OF THE STARS
SUITE 1400
LOS ANGELES, CA 90067

EXAMINER	
NGUYEN, PHILLIP H	
ART UNIT	PAPER NUMBER
2191	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	12/19/2006	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/696,280	NISHIYAMA, HIROYASU	
	Examiner	Art Unit	
	Phillip H. Nguyen	2191	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 October 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *29 October 2003* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *20031029*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. This action is in response to the original filing of October 29, 2003. Claims 1-21 are pending and have been considered below.

Drawings

2. Figure 2 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

3. The drawings are objected to because Figure 11 shows item 1102, Main Memory, is not described in the specification. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the

several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

4. The disclosure is objected to because of the following informalities: Page 6, line 17 of the specification discloses "The interpreter is read from the disk device 1103 onto a main storage device 1103". It is unclear to the examiner whether the interpreter is read from the disk device 1103 into a main memory 1102 or the interpreter is read from the disk device onto another disk device (not shown). For the examining purposes, the examiner assumes it reads onto a main memory 1102 as showing in Figure 11.

Appropriate correction is required.

Claim Rejections - 35 USC § 101

5. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

6. Claims 1-10 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. Claim 1 recites an interpreter comprises

modules, which are directed to software, per se, lacking of storage on a medium, which enables any underlying functionality to occur. The specification provides intrinsic evidence that interpreter is software program. Although, the interpreter cooperates with a processor, the processor is not part of the interpreter. Instead, it uses the processor to execute the native code. Therefore, it is software, per se. Software is descriptive material, per se, and is therefore non-statutory. Additional item to consider is that the claim is directed to an abstract idea that is not tied to a technological art, environment or machine which would accomplished a practical application producing a concrete, useful, and tangible result to form the basis of statutory subject matter under 35 U.S.C. 101. For instance, "executes the native code through hardware emulation". Hardware emulation is an abstract idea. It is a pretending process that executes the native code. Abstract idea is non-statutory. Claims 2-10 are directly or indirectly depend on claims 1, and therefore, are rejected under the same reason set forth to claim 1.

7. Claims 6-7 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. The language of claim 6 raises a question as to whether the end result of the claim accomplishes a practical application, i.e., produces a useful, concrete, and tangible result. For instance, "wherein, when the target code is determined to be a native code, the native code emulator processes the native code" is lacking of useful, concrete, and tangible result because the outcome is not completed. What is going to happen when the target code is determined to be an interpreter code? There is an alternative path exists in this claim. Therefore, claim 6 is

non-statutory. Claim 7 is directly depend on 6 and therefore, rejected under the same reason set forth to claim 6.

8. Claims 11-15 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. Claim 11 recites an interpreter comprises modules, which are directed to software, per se, lacking of storage on a medium, which enables any underlying functionality to occur. The specification provides intrinsic evidence that interpreter and the modules are software programs. Although, the interpreter cooperates with a processor, the processor is not part of the interpreter. Instead, it uses the processor to execute the native code. Therefore, it is software, per se. Software is descriptive material, per se, and is therefore non-statutory. Additional item to consider is that the claim is directed to an abstract idea that is not tied to a technological art, environment or machine which would accomplished a practical application producing a concrete, useful, and tangible result to form the basis of statutory subject matter under 35 U.S.C. 101. For instance, "a monitoring module that monitors a memory access instruction by the native code" does not produce an executable code that an interpreter would normally do. Claims 14-15 are directly or indirectly depend on claims 11, and therefore, are rejected under the same reason set forth to claim 11.

Claim Rejections - 35 USC § 112

9. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

10. Claims 6-7 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 6 recites, "wherein, when the target code is determined to be a native code, the native code emulator processes the native code". It is unclear to the examiner whether the native code emulator that executes the native code through hardware emulation would still perform the execution when the target code is determined to be an interpreter code instead.

Claim Rejections - 35 USC § 102

11. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

12. Claims 1-3, 5-12, and 14-19 are rejected under 35 U.S.C. 102(e) as being anticipated by Desoli (United States Patent No.: US 6,907,519 B2).

As per claim 1:

Desoli discloses an interpreter that executes a program written in a programming language in cooperation with a processor, the interpreter comprising:

- a module that calls a native code ("**as is generally known to persons having ordinary skill in the art, interpreters receive code, interpret it by determining the underlying semantics associated with the code, and carry out the semantic actions**" Col 4, line 27-30, **a native code has been called or received in order to perform the execution**); and
- a native code emulator that executes the native code through hardware emulation ("**emulation system 100 is also configured to execute native code that is integrated with the emulated code...emulation system 100 comprises an emulator 102**" Col 3, line 48-51).

As per claim 2:

Desoli discloses the interpreter as in claim 1 above; and further discloses:

- wherein the native code emulator includes a monitoring module to monitor a memory access instruction by the native code ("**emulator 102 determines whether the instruction fetching action that was conducted in block 400 would have created an exception in the emulated system. By way of example, such an exception could have arisen where there was no permission to access the portion of memory at which the instruction(s) would have been located**" Col 12, line 2-8).

As per claim 3:

Desoli discloses the interpreter as in claim 1 above; and further discloses:

- a table ("**Translation Lookaside Buffer**" Col 10, line 30) for memory regions that are managed by the interpreter wherein the table records information as to whether or not each of the memory regions is accessible from the native code ("**save the native context at the time of the exception and storing it away for later...**" **Col 10, line 45-46, the exception occurs when an illegal instruction accesses memory. Native context indicates whether or not each of the memory region is accessible from the native code**).

As per claim 5:

Desoli discloses the interpreter as in claim 3 above; and further discloses:

- wherein the native code emulator execute the native code, the monitoring module refers to the table to detect an illegal reference that is made when the memory access instruction is executed ("**emulator 102 determines whether the instruction fetching action that was conducted in block 400 would have been created an exception in the emulated system...This determination is made with reference to the information contained within the system description**" Col 12, line 2-10).

As per claim 6:

Desoli discloses the interpreter as in claim 1 above; and further discloses:

- a determination module that makes a determination as to whether a target code in a program to be executed is an interpreter code or a native code,

wherein, when the target code is determined to be a native code, the native code emulator processes the native code ("**native code interceptor module 108 (part of the emulator) is configured to detect native code 118 inserted within emulated code 116 and to execute the native code 118**" Col 4, line 48-50).

As per claim 7:

Desoli discloses the interpreter as in claim 6 above; and further discloses:

- wherein, when the transition between execution of an interpreter code and execution of a native code is performed by a native method call, the determination module does not make the determination until a native method call occurs ("**native code interceptor module 108 (emulator includes a native code interceptor module and an emulation module) is configured to detect native code 118 inserted within emulated code 116 and to execute the native code 118**" Col 4, line 48-50, **a module can contain one or several methods. When the determination process starts, a native method of the native code interceptor module gets called to detect native code. The determination process takes place after it detects native code**).

As per claim 8:

Desoli discloses the interpreter as in claim 1 above; and further discloses:

- wherein the native code emulator stores execution state of portion of the native code ("**saving the native context at the time of the exception and storing it away for later when control is returned to it once the exception condition is resolved**" Col 10, line 45-47, **native context indicates the execution state when the exception occurs**).

As per claim 9:

Desoli discloses the interpreter as in claim 8 above; and further discloses:

- wherein internal state of the interpreter and the execution state of the portion of the native code are saved when the program is stopped and execution state of the program is saved ("**saving the native context at the time of the exception and storing it away for later when control is returned to it once the exception condition is resolved**" Col 10, line 45-47, **when the exception occurs, the program is stopped**).

As per claim 10:

Desoli discloses the interpreter as in claim 9 above; and further discloses:

- wherein the execution state of the program saved is read out to restart execution of the program from a point where the program is stopped ("**native**

context may be saved and restored later to handle the reentrance" Col 10, line 49-51).

As per claim 11:

Desoli discloses an interpreter that executes a programming language in cooperation with a processor, the interpreter comprising:

- a module that calls a native code ("**as is generally known to persons having ordinary skill in the art, interpreters receive code, interpret it by determining the underlying semantics associated with the code, and carry out the semantic actions**" Col 4, line 27-30, **a native code has been called or received in order to perform the execution**); and
- a monitoring module that monitors a memory access instruction by the native code ("**emulator 102 determines whether the instruction fetching action that was conducted in block 400 would have created an exception in the emulated system. By way of example, such an exception could have arisen where there was no permission to access the portion of memory at which the instruction(s) would have been located**" Col 12, line 2-8).

As per claim 12:

Desoli discloses the interpreter as in claim 11 above; and further discloses:

- a table ("**Translation Lookaside Buffer**" Col 10, line 30) for memory region that are managed by the interpreter wherein the tables records information as

to whether or not each of the memory region is accessible from the native code ("**save the native context at the time of the exception and storing it away for later...**" **Col 10, line 45-46, the exception occurs when an illegal instruction accesses memory. Native context indicates whether or not each of the memory region is accessible from the native code**).

As per claim 14:

Desoli discloses the interpreter as in claim 11 above; and further discloses:

- a native code emulator that executes the native code through hardware emulation ("**emulation system 100 is also configured to execute native code that is integrated with the emulated code...emulation system 100 comprises an emulator 102**" Col 3, line 48-51).

As per claim 15:

Desoli discloses the interpreter as in claim 14 above; and further discloses:

- wherein, when the native code emulator executes the native code, the monitoring module refers to the table to detect an illegal reference that is made when the memory access instruction is executed ("**emulator 102 determines whether the instruction fetching action that was conducted in block 400 would have been created an exception in the emulated system...This determination is made with reference to the information contained within the system description**" Col 12, line 2-10).

As per claim 16:

Desoli discloses a native code execution method for an interpreter that has a native code calling function and executes a programming language in cooperation with a processor, the native code execution method comprising the steps of:

- calling a native code ("**as is generally known to persons having ordinary skill in the art, interpreters receive code, interpret it by determining the underlying semantics associated with the code, and carry out the semantic actions**" Col 4, line 27-30, **a native code has been called or received in order to perform the execution**); and
- executing the native code by a native code emulator through hardware emulation ("**emulation system 100 is also configured to execute native code that is integrated with the emulated code...emulation system 100 comprises an emulator 102**" Col 3, line 48-51).

As per claim 17:

Desoli discloses the method as in claim 16 above; and further discloses:

- wherein the native code is not directly executed by hardware ("**the executing program is unaware that it is not executing directly on computer hardware**" Col 4, line 6-8).

As per claim 18:

Desoli discloses the method as in claim 17 above; and further discloses:

- the step of monitoring a memory access instruction by the native code ("**emulator 102 determines whether the instruction fetching action that was conducted in block 400 would have created an exception in the emulated system. By way of example, such an exception could have arisen where there was no permission to access the portion of memory at which the instruction(s) would have been located**" Col 12, line 2-8).

As per claim 19:

Desoli discloses the method as in claim 18 above; and further discloses:

- creating a table of memory region that are managed by the interpreter; and recording in the table information as to whether or not each of the memory region is accessible from the native code ("**save the native context at the time of the exception and storing it away for later..." Col 10, line 45-46, the exception occurs when an illegal instruction accesses memory. Native context indicates whether or not each of the memory region is accessible from the native code**).

Claim Rejections - 35 USC § 103

13. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

14. Claims 4, 13, 20, and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Desoli (United States Patent No.: US 6,907,519 B2), in view of Eustace et al. (United States Patent No.: 5,613,063).

As per claim 4:

Desoli discloses the interpreter as in claim 3 above, but does not explicitly discloses wherein the table records information as to whether or not each of the memory region is readable, writeable or executable from the native code.

However, Eustace discloses an analogous table records information of memory access ("**a table of write tags**" Col 3, line 24).

Therefore, it would have been obvious to one having an ordinary skill in the art to modify Desoli's system to include Eustace' table with a write tag. One of the ordinary skilled in the art would have been motivated to modify Desoli's system **to have a table with a write tag in order to indicate the ensuing valid write operation** (see Eustace Col 4, line 13-14).

As per claims 13 and 20:

Reciting the same limitation as recited in claim 4, and therefore, are rejected under the same reason.

As per claim 21:

Desoli and Eustace disclose the method as in claim 20 above; and Desoli further discloses:

- the step of, when the native code emulator executes the native code, referring to the table to detect an illegal reference that is made when the memory access instruction is executed ("**emulator 102 determines whether the instruction fetching action that was conducted in block 400 would have been created an exception in the emulated system...This determination is made with reference to the information contained within the system description**" Col 12, line 2-10).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Phillip H. Nguyen whose telephone number is (571) 270-1070. The examiner can normally be reached on Monday - Friday 10:00 AM - 3:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wei Y. Zhen can be reached on (571) 272-3708. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

PN
12/6/06

Wei Zhen
Supervisory Patent Examiner

WEI ZHEN
SUPERVISORY PATENT EXAMINER